

Hot Mix Asphalt - Mix Verification Process for Local Agencies. This is an outline of the intent of the revised Specification 5-04.3.

1. Prior to the production of HMA, the contractor shall determine a design aggregate structure and asphalt binder content in accordance with WSDOT Standard Operating Procedure (SOP) 732. Once the design aggregate structure and asphalt binder content have been determined the contractor shall submit the HMA mix design on DOT form 350-042 demonstrating that the design meets the requirements of Sections 9-03.8(2) and 9-03.8(6).
2. Mix verification shall be accomplished by any one of the following processes:
 - a. Submit samples to WSDOT Materials Lab for WSDOT verification testing per current WSDOT Standard Specifications.
 - b. The contracting agency or an appointed designee will perform tests to verify the mix per the Field Verification Testing Process.
 - c. Use a reference mix verification. Reference a mix verification that is based on Field Verification Test results from a previous project using the same mix as submitted for the current project. Acceptance testing may also apply.
 - d. Perform verification testing on a sample of mix provided by the contractor prior to paving. When this method is used acceptance testing may also apply.
3. Field Verification Testing Process. The Contracting agency or its appointed designee will collect three Production Samples of HMA mix from the first day of paving per AASHTO T 168 sampling procedures.
 - a. The Contracting agency or designee will test one Production Sample in accordance with Section 5-04.3(8)A for field verification per the requirements of Section 9-03.8(7)
 - b. If the test results from the Production Sample are within tolerances of Section 9-03.8(7), the mix design will be considered **verified** and the test results may be used as acceptance sample number 1.
 - c. If the test results from the Production Sample are outside the tolerances of Section 9-03.8(7), the other two samples will be tested and the results of all three tests will be used for acceptance in accordance with Section 5-04.5(1) and subject to a Quality Assurance Price Adjustment.
4. For projects with HMA plan quantities less than 2500 tons of HMA, if the test results of the first Production Sample verify the contractor's mix design the two additional samples may be discarded and, at the engineer's discretion, further testing may be eliminated.
5. For projects with HMA plan quantities greater than 2500 tons of HMA, sampling and testing for acceptance will be in accordance with Section 5-

04.3(8)A after the first 2500 tons of mix placed or at the Engineer's discretion.

6. Prior to the first day of paving, six Ignition Furnace Calibration Samples will be obtained to calibrate the Ignition Furnaces being used on the project to the mix. Calibration samples shall be provided by the contractor when directed by the engineer. Calibration samples shall be prepared in accordance with WSDOT SOP 728. A complete on-line version of the WSDOT Materials Manual can be accessed free at:
<http://www.wsdot.wa.gov/publications/manuals/fulltext/M46-01/Materials.pdf>
7. Moisture Susceptibility (percent of anti-strip required) will be evaluated one of the following three ways:
 - a. The engineer may request historical mix design data and recommendations be provided by WSDOT. Not all sources have historical data available
 - b. Testing by WSDOT
 - c. Testing by the Contractor using WSDOT TM 718
8. Mix design verification is valid for one year from the date of verification. At the discretion of the engineer, agencies may accept mix designs verified beyond the verification year with certification from the contractor that the materials and sources are the same as those shown on the original mix design.
9. Projects with HMA plan quantities less than 400 tons for a class of HMA shall require one of the following:
 - a. Mix design data submittal on WSDOT Form 350-042 demonstrating that the design meets the requirements of Sections 9-03.8(2) and 9-03.8(6)
 - b. HMA mix design with current verification results.
 - c. Commercial Evaluation per Section 5-04.3(7) A, item 3.

Example 1 – Mix verification, sampling, and testing. Agency has a project with 4500 tons of HMA Class 1½”.

- Contractor submits mix design as described in item 1
- First day of paving the agency takes 3 samples and tests 1 for verification
 - Gradation
 - Binder content
 - Volumetric properties
- The first sample verifies the mix design submitted.
- After the 2500 ton mark random sampling begins at the rate of 1 sample per 800 tons of hot mix placed.

- Testing of all samples after the 2500 ton mark will be for gradation and binder content, unless statistical acceptance is specified for the contract. Aggregate sampling will be 1 sample per 2500 tons of mix placed and be tested for fracture and SE.
- End of project total for mix placed is 4685 tons. Agency has 1 verification testing sample from first 2500 tons of paving, 3 acceptance sample tests from the remaining 2185 tons and two mineral aggregate sample tests.
- Compaction testing proceeds as outlined in the WSDOT Standard Specification 5-04.3(10)B.
- A test Section may be allowed at the discretion of the engineer.

Example 2 – Mix verification, sampling and testing. An agency has a project with 1500 tons of HMA Class 1½”.

- Contractor submits mix design as described in item 1
- First day of paving agency pulls 3 samples and tests 1 for verification
 - Gradation
 - Percent Binder
 - Volumetric properties
- The first sample verifies the mix design submitted.
- Agency tosses the other 2 samples and everyone is happy.

Example 3 – Mix verification, sampling, and testing. An agency has a project with 1500 tons of HMA Class 1½”.

- Contractor submits mix design as described in item 1
- First day of paving agency pulls 3 samples and tests 1 for verification
 - Gradation
 - Percent Binder
 - Volumetric properties
- The first sample fails
- Agency tests the remaining two samples getting mixed results and uses the gradation, percent binder, and volumetric properties from the submitted mix design to calculate a Quality Assurance Price Adjustment per Section 5-04.5(1).
- Payment reflects a credit for accepting an out of specification material or the files contain an engineering evaluation that details why the material is acceptable without a credit price adjustment.

Mix Acceptance

1. No acceptance samples are required for total job quantities of a class of HMA under 400 tons. The contractor submits the mix design for review and approval and certifies the material placed is the same material as described in the mix design.
2. Acceptance for all projects that require testing is based on:
 - a. Percent asphalt binder, gradation, and air voids for verification sample then;
 - b. Percent binder and gradation at frequency described in the Verification Process above.
 - c. Compaction to 91% of Rice density minimum. Changes to the compaction requirement can be made at the discretion of the engineer.

TERMS:

Hot Mix Asphalt (HMA) – A combination of mineral aggregates, asphalt binder, and other materials that is used as pavement

Mineral Aggregate – Fractured rock and fine material used as an ingredient in HMA.

Asphalt Binder – Asphalt (Oil) material that is used to bind aggregate pieces together in HMA.

PG Binder – Performance Grade asphalt binder.

Mix Design or (JMF-Job Mix Formula) – The recipe for hot mix asphalt that will be used on a project.

Mix Design Verification: Once the design aggregate structure and asphalt binder content have been determined, the contractor submits the Mix Design on DOT form 350-042 demonstrating that the design meets the requirements of Sections 9-03.8(2) and 9-03.8(6) then WSDOT Asphalt Lab tests the materials for verification.

Field Verification Testing Process – A process that uses production samples to verify that a mix is made according to a specific mix design.

Mix Verification – A process that verifies that the material delivered to the project meets the requirements of the project specifications

Production Verification Test – Testing performed on samples of mix obtained during the production of HMA for a project, this test replaces the current WSDOT verification process.

Quality Assurance Price Adjustment - Price adjustment calculated per Section 5-04.5(1) of WSDOT Standard Specifications. Non statistical acceptance price adjustments are strictly for out of compliance HMA mix or compaction. Statistical acceptance price adjustments pay the contractor up to five percent over the bid price of the material.

Reference Verification – Using verification test results from one project on another project that is utilizing the same HMA mix design.

Acceptance Testing – Testing that occurs during the placement of HMA on a project.

Ignition Furnace – Equipment used to remove asphalt binder and compute how much binder material is in a sample of HMA prior to testing that sample for gradation.

Ignition Furnace Calibration Sample – A sample of HMA with a known percent of asphalt binder that is used to calibrate an ignition furnace to the production mix that will be tested in that oven.

Moisture Susceptibility – A property of mineral aggregate that prevents even binder coating of mineral aggregate.

Certification – A document provided by the contractor stating that the properties of the HMA used on the project are the same as those on the mix design that was approved for the project.